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Learning Theories and Teacher Education

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Abstract:

With the development of different theories of learning, i.e. behaviourism, cognitivism, constructivism and neuro-education, teaching- learning strategies has changed drastically to a high degree. Even though the constructivist approach of teaching-learning has been considered as the best form of approach for 21st century classrooms, yet we totally cannot overlook the behavioristic and cognitive approaches. If we look into the different developmental stages of the theories, we find that, in order to overcome the drawbacks of one approach, a new approach of learning has been developed with its own drawback. In this paper, similarities of the three learning theories on knowledge evolution have been focused, highlighting upon the importance of incorporating all the approaches of learning in teacher education vis-a–vis school education. Learning strategies cannot be confined to a particular approach of learning theory; rather it needs to accumulate strengths of every learning approach as it demands.

Keywords: *Learning Approaches, Knowledge, Bloom's Taxonomy.*

1. INTRODUCTION:

Teacher Education scenario today is a cause for serious concern. The main purpose of the Teacher Training Institute is to equip teachers to meet the reform needs of schools throughout the country. Today's teachers are expected to play a variety of roles in the classroom: educators, motivators, guide, counselors, coaches and disciplinarians. In addition, teachers must continually educate themselves, learning about new advances in education, new technologies and new ways to encourage their students to reach their full potential. Teachers must be trained to face diverse students in the classroom. Teaching-learning Strategies must be adopted keeping in view the learners' requirements. Hence, teachers must possess knowledge of multiple teaching-learning approaches and their applications according to the content in hand.

This paper concentrates on a critical review of the three most influential learning theories and it discusses the foundation upon which the constructivist theory of learning is rooted. A structural design on knowledge development in respect of a new content has been highlighted and the three approaches viz. behaviourism, cognitivism and constructivism been forwarded with importance of inclusion of constructivist approach of teaching-learning in teacher education institutes for teacher training purposes.

2. BEHAVIOURISM:

According to the learning theories propounded by the behaviorists, learning is a mechanical process of associating the stimulus with response, which produces a new behavior. Such behavior is strengthened by the reinforcement. Main proponents of this theory were J.B.Watson and I. Pavlov. Behaviorists view the learner as a passive person who responds to the stimuli. According to them the learner starts as *tabula rasa (*which means clean slate) and the behavior is shaped by reinforcement. Positive as well as negative reinforcement increase the probability of the repetition of behavior. However punishment decreases the chance of repetition of the behavior. Learning is therefore defined as a change in the behavior of the learner.

The behaviorist school sees the mind as a "black box," in the sense that a response to a stimulus can be observed quantitatively, totally ignoring the effect of thought processes occurring in the mind. The school, therefore, looks at overt behaviors that can be observed and measured as indicators of learning (Good & Brophy, 1990).

2.1. Strengths:

1. It can be used to formulate behavioral contracts in the school as well as at home.
2. It is helpful in bringing about behavior modification (desired outcome) with the help of reinforcement, punishment and extinction.
3. Cueing responses to behavior allow the learner to react in a predictable way under certain conditions.
4. Success of outcomes is easily measurable.
5. Guarantees specific learning.
6. Ease of application.

2.2. Weaknesses:

1. Some critics say that it is an extrapolation of animal behavior to humans.
2. Behaviorism fails to explain the development of human languages.
3. Effect of environment in shaping the behavior of a human, is not taken into account by the behaviorists.

2.3. Application of this theory:

The techniques of reinforcement and punishment have been employed by the teachers in the classrooms to promote desirable behavior and discourage unwanted behavior of the learners.

2.4. Implications

1. Learners should be told the explicit outcomes of the learning so that they can set expectations and can judge for themselves whether or not they have achieved the outcome of the day's lesson.

2. Learners must be tested to determine whether or not they have achieved the learning outcome. CCE forms of testing and assessment should be integrated into the learning sequence to check the learner's achievement level and to provide appropriate feedback.
3. Learning materials must be sequenced appropriately to promote learning. The sequencing could take the form of simple to complex, known to unknown, and knowledge to application.
4. Learners must be provided with feedback so that they can monitor how they are doing and take corrective action if required.

3. COGNITIVISM:

Cognitivism refers to the study of the mind and how it obtains, processes, and stores information (*Stavredes, 2011*). This theory was a response to behaviorism. It was argued that not all learning occurs through shaping and changing of behaviors. In this theory, learners are active participants in their learning, and the mind functions like a computer processor. Information comes in as input, the mind processes the information for the time being, and the information is stored away to be retrieved later (*Learning Theories, 2011b*). Learning is shaped by acquired learning strategies and prior knowledge and attitudes, called schemas. The cognitive view of learning is teacher-centered, and information must be presented in an organized manner in order to achieve the most efficient learning.

3.1. Strengths:

1. **Organized structure to learning:** Information comes in and is processed into short term memory before being stored away in long term memory.

2. When problems are broken down into smaller parts, learners are not overwhelmed with incoming information and have time to process smaller bits.

3.2. Weaknesses: Because learning is very structured, it may become difficult to adapt to changes in what has already been processed and learned.

3.3. Application of this theory:

Cognitivism is suited well for problem solving, where the concepts are complex and must be broken down into smaller parts. Ideas and concepts from these problems are linked to prior knowledge, which in turn helps the learner develop a stronger comprehension. (Stavredes, 2011)

3.4. Implications:

1. Learners should be told why they should take the lesson, so that they can attend to the information throughout the lesson.
2. Information critical for learning should be highlighted to focus learners' attention.

3. The difficulty level of the material must match the cognitive level of the learner, so that the learner can both attend to and relate to the material. Links to both simpler and more complicated materials can be used to accommodate learners at different knowledge levels.
4. Strategies should be used to allow learners to retrieve existing information from long-term memory to help make sense of the new information. Learners must construct a memory link between the new information and some related information already stored in long-term memory.
5. Information should be chunked to prevent overload during processing in working memory (*Miller, 1956*).To facilitate deep processing, learners should be asked to generate the information maps during the learning process or as a summary activity after the lesson (*Bonk & Reynolds, 1997*).
6. Other strategies that promote deep processing should be used to help transfer information to long-term storage. Strategies that require learners to apply, analyze, and evaluate promote higher-level learning, which makes the transfer to long-term memory more effective.

4. CONSTRUCTIVISM:

Constructivism is the study of a learner's own construction of knowledge (*Learning Theories, 2011c*). This knowledge is constructed through one's own personal experiences and interactions with the outside world. The learner takes in new information and gives meaning to it using his or her own prior attitudes, beliefs, and experiences as references (*Stavredes, 2011*). Learners are active participants in the construction of knowledge while the instructor serves as a facilitator. Two types of constructivism emerged beginning in the late 1970s. Lev Vygotsky introduced social constructivism, in which social interaction with others helps the learner put meaning to information.

Vygotsky noted a Zone of Proximal development in which learners can develop a certain level of meaning on their own but can grow even greater after interacting with classmates and instructors. **In 1985, Jean Piaget introduced cognitive constructivism**, in which knowledge is constructed by either assimilation or accommodation. In assimilation, incoming information is associated with a schema, and in accommodation, incoming information does not match a schema. Thus, the schema must be changed to accommodate this conflict (*Stavredes, 2011*).

Constructivists see learners as being active rather than passive. Knowledge is not received from the outside or from someone else; rather, it is the individual learner's interpretation and processing of what is received through the senses that creates knowledge. The learner is the center of the learning, with the instructor playing an advising and facilitating role. Learners should be allowed to construct knowledge rather than being given knowledge through instruction (Duffy & Cunningham, 1996).

A major emphasis of constructivists is situated learning, which sees learning as contextual. Learning activities that allow learners to contextualize the information should be used in online

instruction. If the information has to be applied in many contexts, then learning strategies that promote multi-contextual learning should be used to make sure that learners can indeed apply the information broadly. Learning is moving away from one-way instruction to construction and discovery of knowledge (*Tapscott, 1998*).

4.1. Strengths:

1. Constructivist activities are generally relevant to the learner and real-world based.
2. Learners construct knowledge and meaning as they can relate the information to their own experiences, beliefs, and attitudes.

4.2. Weaknesses:

1. Individual experiences and attitudes can vary.
2. A specific, desired outcome may not always be achieved when different people approach the problem or task.

4.3. Application of this theory:

Constructivism is best utilized when learners take control of the learning situation, such as in Problem-Based Learning. *As learners engage themselves in an activity like this, they develop an understanding of the importance of the problem, comprehend the relevance of the topic, and construct knowledge through their experiences. It is more important to focus on the whole rather than the individual parts in constructivist learning* (Stavredes, 2011). Constructivism is sometimes misconstrued as a theory that compels students to reinvent the wheel, but instead, it implores students to attempt to learn how it functions and apply this to real-world learning. (*Educational Broadcasting, 2004*)

4.4. Implications:

1. Learning should be an active process. Keeping learners active doing meaningful activities results in high-level processing, which facilitates the creation of personalized meaning. Asking learners to apply the information in a practical situation is an active process, and facilitates personal interpretation and relevance.
2. Learners should construct their own knowledge rather than accepting that given by the instructor. Knowledge construction is facilitated by good interactive online instruction, since the students have to take the initiative to learn and to interact with other students and the instructor, and because the learning agenda is controlled by the student (*Murphy& Cifuentes, 2001*).
3. Collaborative learning should be encouraged to facilitate constructivist learning (*Hooper & Hannafin, 1991; Johnson &Johnson, 1996; Palloff & Pratt, 1999*). Working with other learners gives learners real-life experience of working in a group, and allows them to use their metacognitive skills. Learners will

also be able to use the strengths of other learners, and to learn from others. When assigning learners for group work, membership should be based on the expertise level and learning style of individual group members, so that individual team members can benefit from one another's strengths.

4. Learners should be given control of the learning process. There should be a form of guided discovery where learners are allowed to make decision on learning goals, but with some guidance from the instructor.
5. Learning should be made meaningful for learners. The learning materials should include examples that relate to students, so that they can make sense of the information. Assignments and projects should allow learners to choose meaningful activities to help them apply and personalize the information.
7. Learning should be interactive to promote higher-level learning and social presence, and to help develop personal meaning. According to Heinich et al. (2002), learning is the development of new knowledge, skills, and attitudes as the learner interacts with information and the environment.

5. DEVELOPMENT OF KNOWLEDGE:

Looking into the concepts of different learning theories, it is evident that all the learning theories have their own importance accordingly and the three important factors to take place learning are:

i) **Learner:** level, Grade, background, individual difference etc.

ii) **Content:** Feasibility of the content, level of expected achievement, attainment of level of mastery etc.

iii) **Environment:** Availability of resources, Teacher, work place, mode of course transaction etc.

In support of the above Illustration, a Knowledge development model has been forwarded and possible acquisition of learning approaches has been reflected considering Loren Anderson version of Bloom's Taxonomy.

All new content in the hands of a teacher is based on some Prior Knowledge of the student for whom the content is meant. Now, the Prior Knowledge of a student may be either spontaneous or non-spontaneous concepts. Spontaneous concepts include the knowledge of what a student learns from the environment or surrounding where he/she is from through a natural process of interaction or intervention with the environment. Non-spontaneous concepts are that knowledge what a student learn in the process of formal form of learning in the previous class in the school and this kind of knowledge is structured and systematic in nature.

In order to elaborate the dimensions of school learning, Vygotsky (1978) described an exceptionally important concept: the zone of proximal development (ZPD). *The latter refers to the idea that there is a zone for each learner, which is bounded on one side by the developmental threshold necessary for learning and on the other side by the upper limit of the learner's current ability to learn the material under consideration* (Vygotsky, 1978).That is the difference between the prior knowledge and

achievable new knowledge (new Content) on a particular material, of a particular learner. *Fig:1* below, reflects how development of Prior Knowledge and New Knowledge of a particular Content take place to a learner.

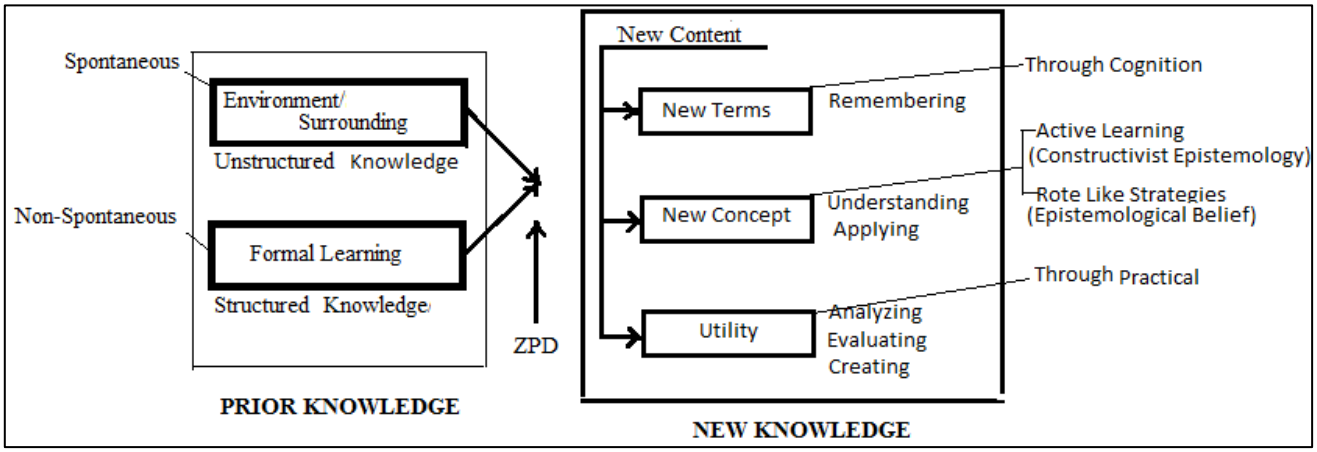

Fig 1: *Development of Knowledge (A Model)*

A new content/concept a teacher going to deal with in a class needs to focus on three factors: i) **New Terms**, ii) **New Concept** and its iii) **Utility.**

(i) New Terms: New terms are those words or vocabulary learner comes across in the new content and they are not aware of actual meaning, definition before and retaining it in their memory. The term "cognition" is also used in a wider sense to mean the act of knowing or knowledge, and may be interpreted in a social or cultural sense to describe the emergent development of knowledge and concepts within a group that culminate in both thought and action.

Remembering is an important entity to grab the new terms in the new content.

(ii) New concept: New concept is the rule, logic, principle or relationship prevailing among the new terms in the content. The conditions for the status apply to conceptions that a learner either holds or is considering. A critical point is that it is only when the learner, rather than the teacher, decides, implicitly or explicitly, that the conditions have been met that conceptual change occurs. Hewson and Thorley (1989) stated the conditions as follows:

1) Is the conception *intelligible* (meaningful) to the learner? That is, does the learner know what it means?

2) Is the conception *plausible* (truthful) to the learner? That is, if the learner also believe that it is true?

3) Is the conception *fruitful* (useful) for the learner? That is, if a conception achieve something of value for the learner?

The extent to which the conception meets these three conditions is termed the *status* of a person's conceptions. The more conditions that a concept meets the higher its status is. If the new conception conflicts with an existing conception it cannot be accepted until the status of the existing conception is

lowered. This only happens if the learner holding the conception has reason to be dissatisfied with it. The learner's conceptual ecology plays a critical role in determining the status of a conception because, amongst other things, it provides the criteria in terms of which he or she decides whether a given condition is (or is not) met (Hewson & Hewson, 1984).

Again, there are mainly two categories of learners. One category is Constructivist epistemology in nature, who evaluates/judges first than believes a new concept and other kind is epistemological belief, believe the new concept without judgment as it is from authentic source. The learner of Constructivist epistemology prefers Active learning whereas the epistemological belief prefers Rote like strategies or empiricism tended.

Here, **Understanding** and **Applying** are the main entities that help to grab the new concept.

(iii) Utility: Utility is the application of the new content what student has learned and using it in the daily life activities or in the practical life. That can be done in the form of Innovative practices or practical use of the new information personally by every learner to achieve highest level of clasp into the new content. **Analyzing, Evaluation** and **Creating** are the main entities learner need to incorporate with the new content.

6. OVERVIEW:

From the above discussion it is clear that both behaviourism and cognitivism are objective in nature and support the practice of analyzing a task and breaking it down into achievable units, establishing objectives, and measuring learner performance based on those objectives. Mayer (1999: 143-144) identified the use of cognitivist strategies as part of a process of knowledge acquisition with information as a commodity that can be transmitted directly from teacher to learner.

Constructivism, on the other hand, promotes a more open-ended learning experience and knowledge construction. Using constructivist strategies allows the learner to be actively involved in constructing a knowledge representation. In this process the learner becomes a sense-maker and the teacher a cognitive guide who provides guidance.

Because of designing challenges associated with constructive learning, it might be easier and less time consuming for a teacher to work from the objective approach to plan teaching, but then the learner and the specific teaching-learning environment is not taken into consideration. Schwier (1995: 119-127) argues *compellingly that the learning content, level of the learner and situation will determine what works, where and how in order to obtain some focus in the approach to instructional design. It is necessary to consider the context before deciding on a specific methodology*.

The learner need to be taught in such a conducive teaching-learning environment that should enable more interpretation of multiple realities and should be competent to deal with problem solving in real life situations. This implies that learners will also be better able to apply their existing knowledge to a novel situation.

7. IMPLICATIONS FOR TEACHER EDUCATION:

Regarding the quality of learning in particular teaching-learning situations, Jonassen (1991: 5-14) point out that the difference between a constructivist view of instructional design and what he calls an objectivist view (behavioural and cognitive) of instructional design is that the objective design has a predetermined outcome and intervenes in the learning process to map a pre-determined concept of reality into the learner's mind, while a constructivist view maintains that because learning outcomes are not always predictable, *instruction should foster learning and not control learning*. Illustrated below, is the suggestion from Ertmer and Newby (1993: 50-70) that different learning theories can be used to complement the learner's level of task knowledge and to meet a variety of learning situations.

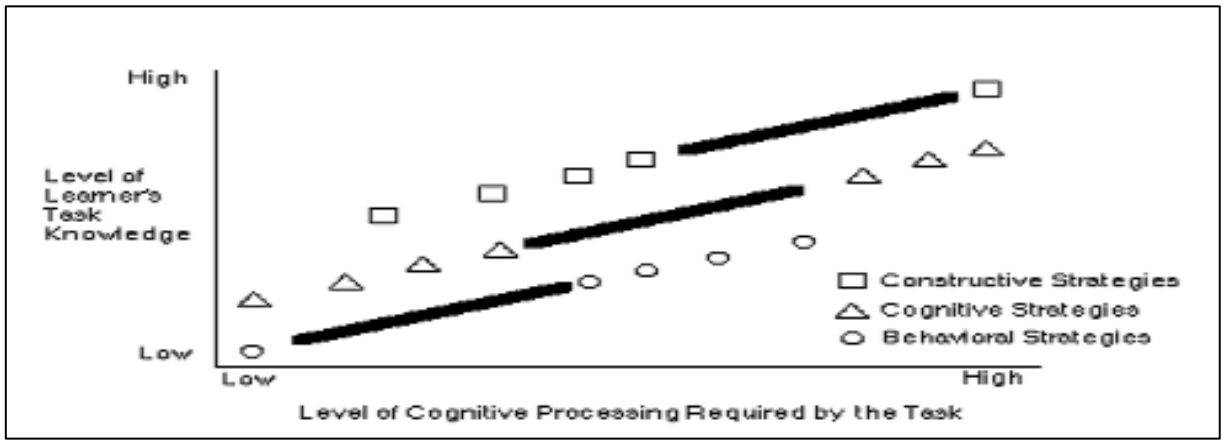

Fig2: *Comparison of the associated instructional strategies of the behavioral, cognitive and constructivist viewpoints based on the learner's level of task knowledge and level of cognitive processing required by the task (From Ertmer and Newby)*

Fig2: confirms that the application of instructional strategies may vary according to the level of knowledge the learner has about the task as well as the particular demand in cognitive processing required by the task. Behavioural strategies are applicable where the task requires low cognitive demands, whereas constructive strategies are of utmost importance in organising and structuring new knowledge, concepts and content. Moreover, in educational evaluation we cannot totally ignore evaluation of cognitive aspect and pattern of declaration of result also does not allow riding away from the behaviorist approach of learning. It is also evident from the figure that constructive strategies assist the learner towards deeper thinking and developing his or her understanding of particular concepts.

8. CONCLUSION:

In teacher Training Institute every teacher must be trained and made aware of all the developed learning theories so that they can take right decision to adopt a learning approach considering the three important factors, i.e. learner, content and environment. For this purpose, a teacher must be well equipped with all the approaches of learning keeping in mind the different factors responsible for the purpose and need to adopt most appropriate approach according to demand of the situation.

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